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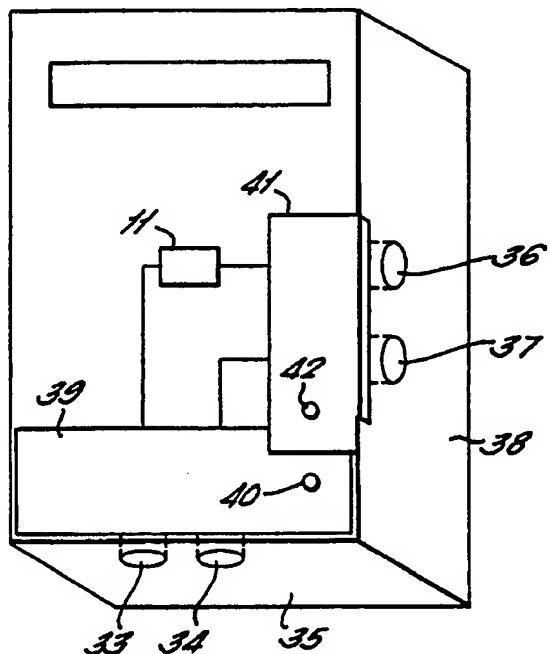
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(54) Modular electricity metering

(57) A metering module 35 for metering mains electricity supply includes the usual supply inlet and outlet terminals 34 - 37. Separate sealing means 39, 41 are provided for protecting access to the inlet terminals and to the outlet terminals, so that authorised access can be provided to the outlet terminals without interfering with the seal for the inlet terminals. Metering modules may be provided with inlet terminal pins 33, 34 for connection to the outlet terminal sockets 36, 37 of another module so as to cascade metering modules for different interested parties.

FIG. 3.



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FIG. 1.
PRIOR ART

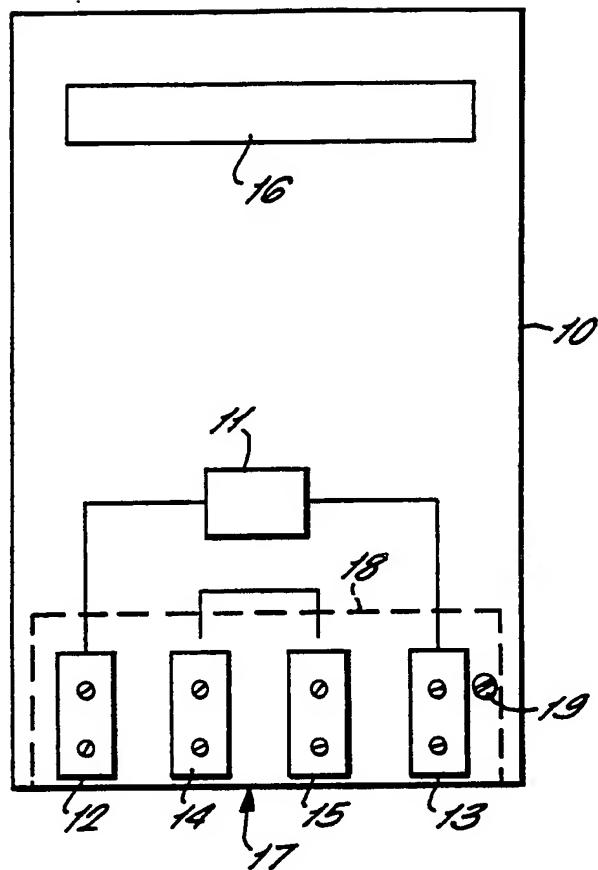
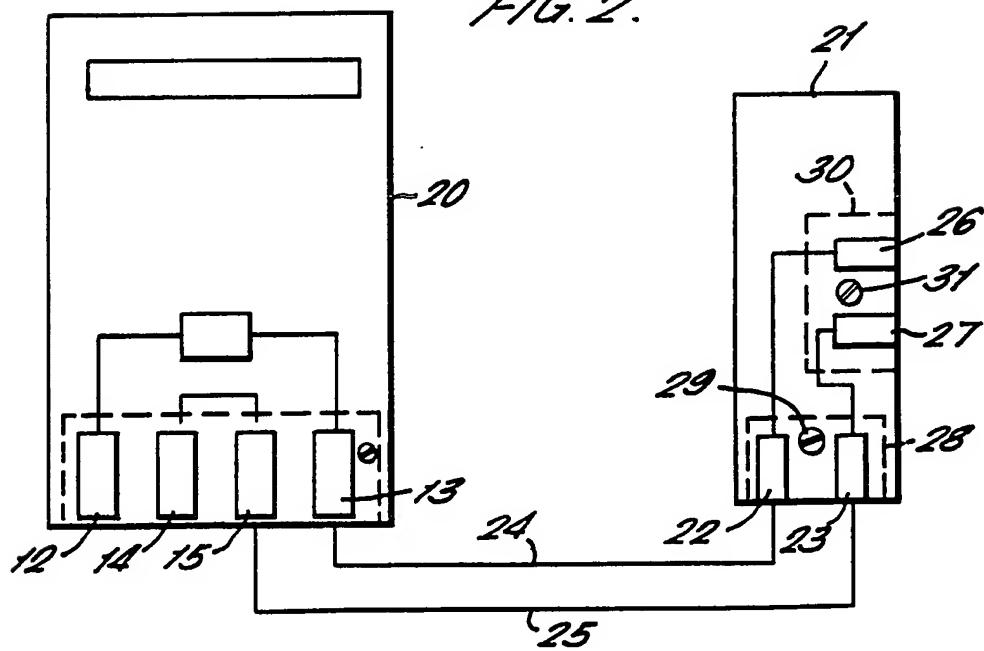


FIG. 2.



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FIG. 3.

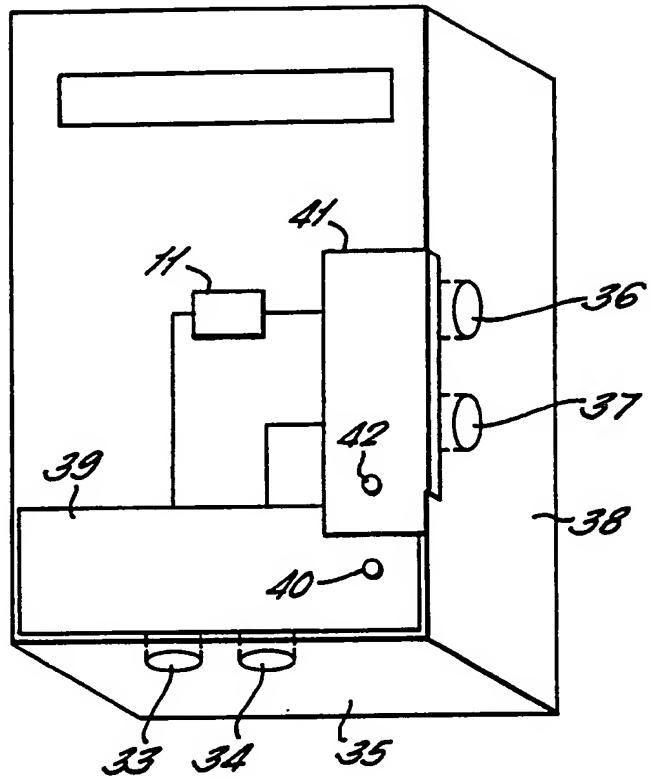
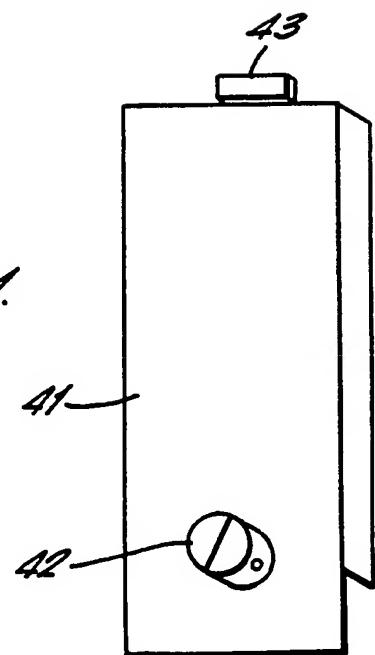


FIG. 4.



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FIG. 5.

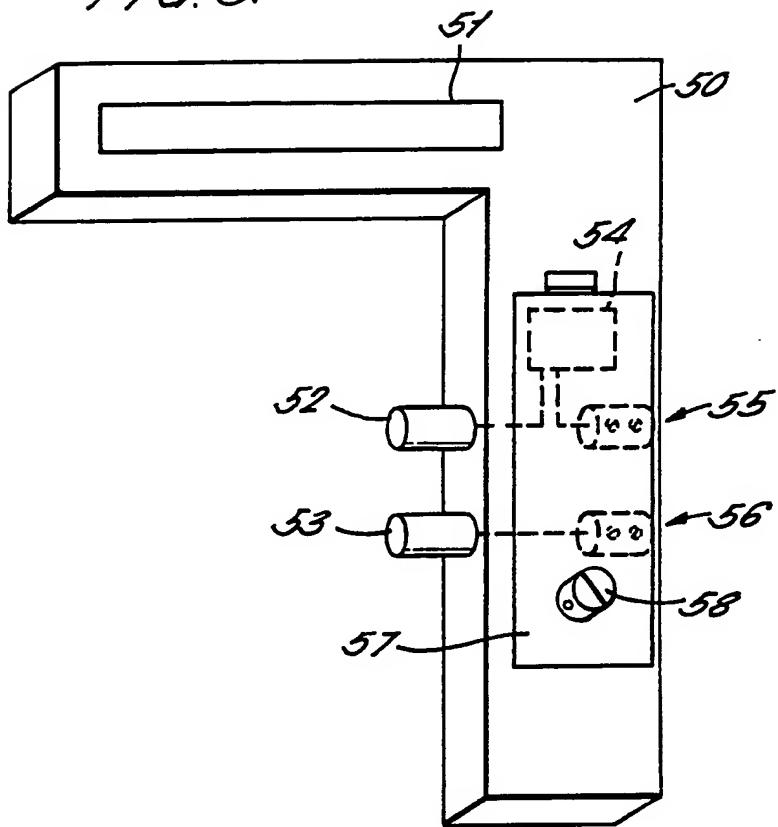
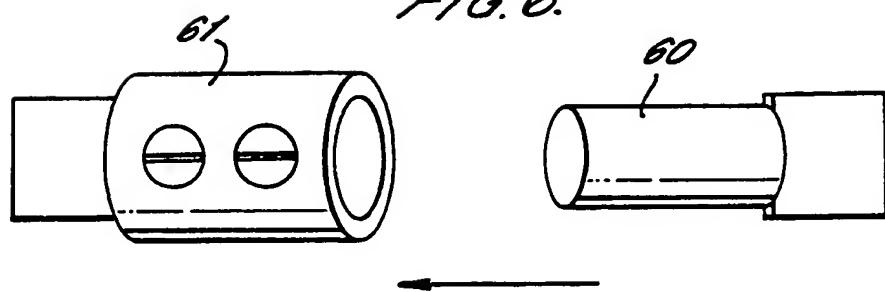
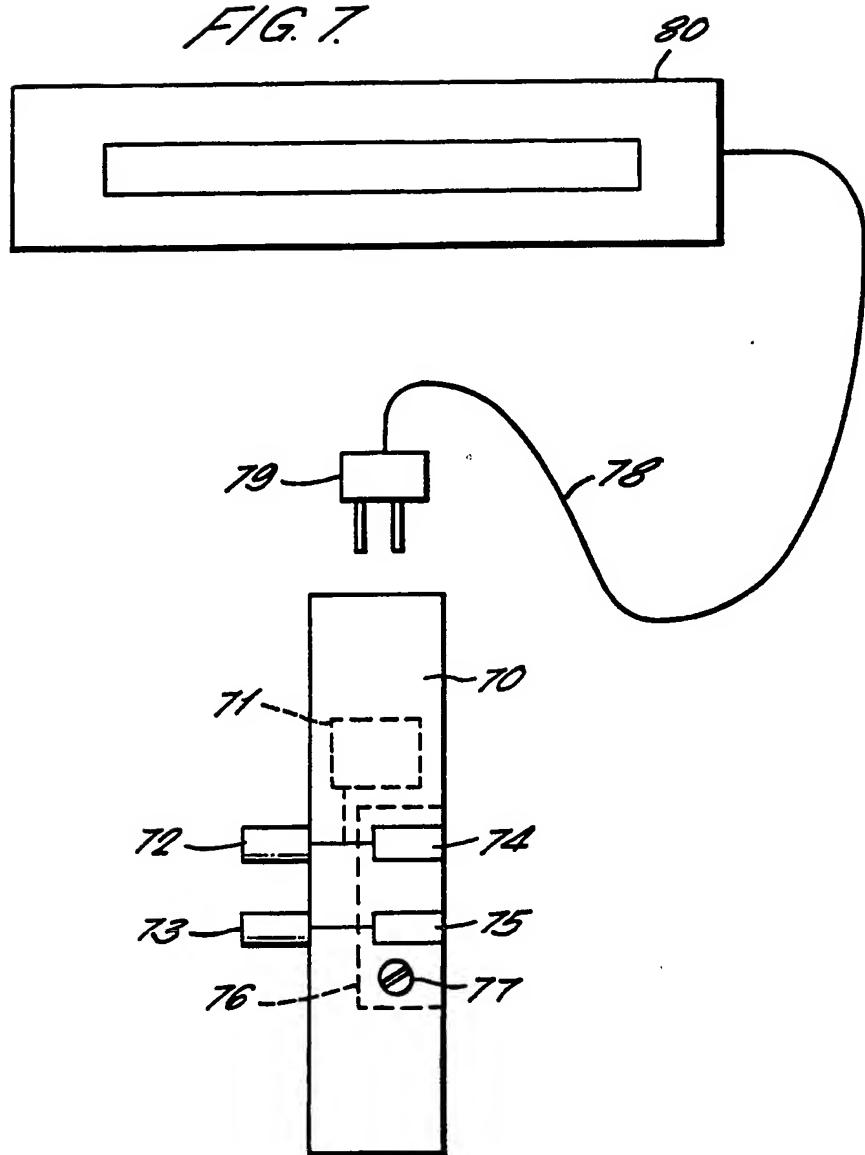


FIG. 6.



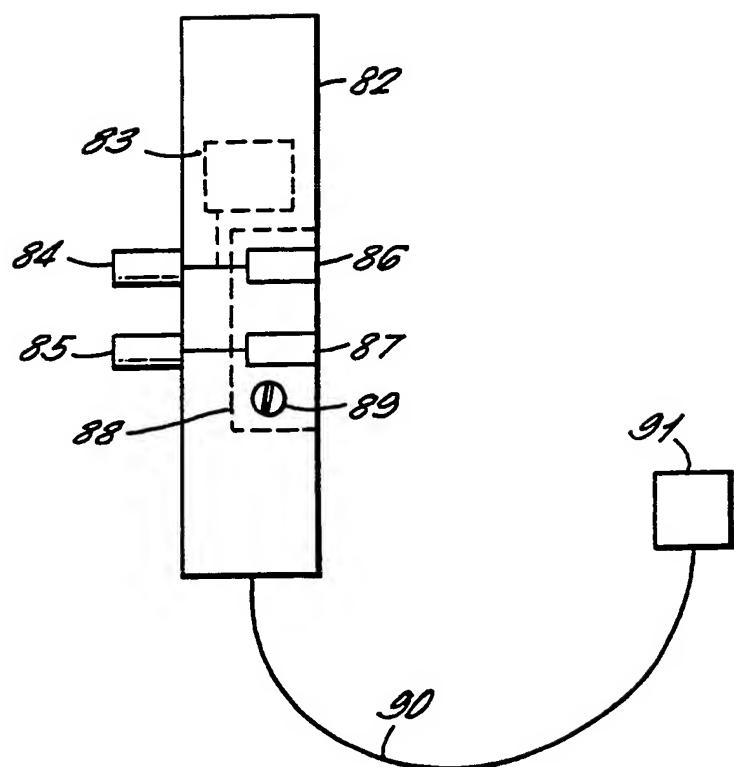
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FIG. 7.



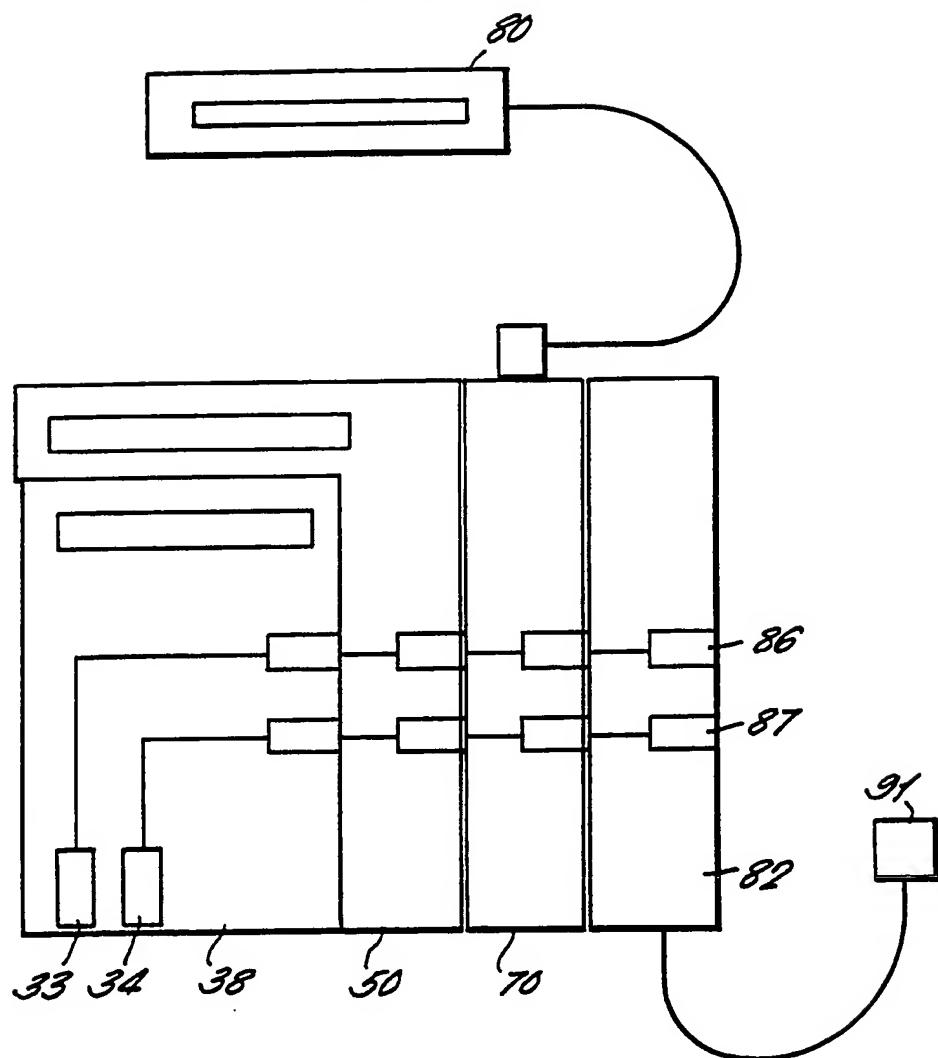
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FIG. 8.



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FIG. 9.



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FIG. 10.

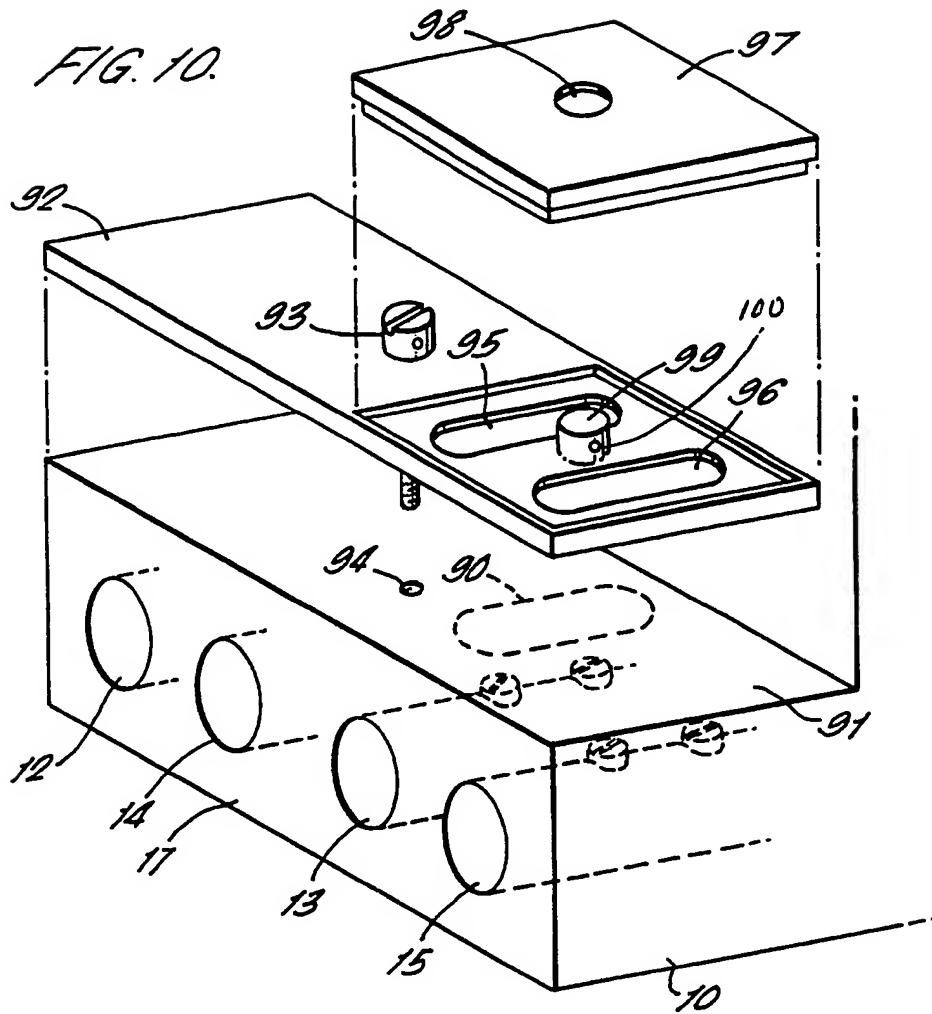
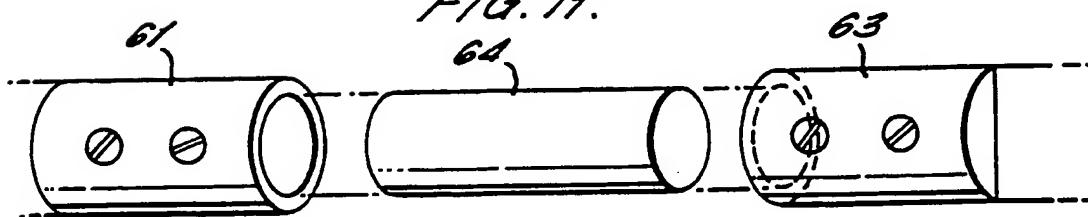


FIG. 11.



MODULAR ELECTRICITY METERING

The present invention relates to metering of electricity supplies at customer premises, and in particular to a modular metering system. The need for a modular metering system for installation at the premises of the electricity customer has arisen, particularly from the opening of the electricity market. It is now, or soon will be, possible for an electricity customer to purchase its electricity from a supplier of its choice, and in particular an organisation different from the local electricity company which actually connects the customer to the electricity distribution system.

Of course, electricity cannot be manufactured and stored for subsequent sale in the manner of other retail products. Accordingly, for an open market electricity supply system, it is necessary to meter the quantity of electricity at each point of interface, or exchange, between parties as it flows from the original generator to a final customer. In the United Kingdom a system has been developed of centrally recording the metered electricity transferred at each stage of its exchange between parties. This collates, for each company concerned in the market, the amount of electricity generated, purchased, transported and sold by each company in each successive thirty minute period and issues bills and payments daily in settlement. The system is known as the "Electricity Pool".

Metering systems to record such exchanges between interested parties are necessarily complex and expensive, but at points of large exchange, ie where the power station of a generator is connected to the main high voltage distribution system or grid, the cost of metering is a small percentage of the revenue being billed. However, to apply the full open market system to individual domestic services implies the need for a comprehensive metering system at each premises where the

revenue being billed maybe relatively small.

In the event of a domestic customer agreeing to purchase his electricity from a supplier other than the local electricity company which connects him to the distribution system, there may be four separate parties who would have an interest in the electricity being consumed at the customer's premises. These would be the supplier itself who is selling the electricity to the customer and wishes to bill the cost of electricity units consumed in accordance with the supplier's tariff. There is then the local electricity company who physically connects the customer to the distribution system, who would wish to bill for units of electricity transported by it into the customers premises on behalf of the supplier. These are known as "use of system" charges. There is then the settlement system of the Electricity Pool which needs to collate the total amount of electricity being bought by the supplier off the distribution system for supply to the supplier's customers. Finally, the customer himself may wish to have access to a metering system to check the charges made by the supplier and for estimating future bills and possibly other purposes.

Clearly, a combined domestic meter to carry out all these functions for each of the interested parties would be expensive and where the customer in fact chooses to remain with his local electricity company as supplier, none of the additional facilities will be required. There has been discussion of employing a modular metering system which would enable individual modules to be fitted at a particular customer's premises as they are required, progressively building up the complexity of the metering system. Each additional module would be paid for by the party requiring it, eg the separate supplier, or by the

customer. The proposal is for a new style basic meter to be installed in customer's premises which would be provided with a communication port to which additional modules could be fitted as required. The communication port would provide a power supply to these additional modules and also data relating to units consumed as measured by the basic meter. However, there are problems in agreeing a protocol for the communication link between a new basic meter and the additional modules, as well as problems in providing an appropriate fused power supply to any modules to be connected to the basic meter. In addition, the proposed new communicating basic meter is likely to cost around twice the cost of an existing basic meter.

The present invention provides the basic hardware for a simple solution to this problem which should avoid many of the technical and cost problems outlined above.

In one aspect, the present invention provides a metering module for metering a mains electricity supply and comprising a casing, supply metering means within the casing, mains supply inlet terminals and mains supply outlet terminals for the module, first sealing means for protecting and sealing said inlet terminals to inhibit unauthorised access thereto, and second sealing means for protecting and sealing said outlet terminals to inhibit unauthorised access to said outlet terminals but to permit authorised access thereto without interfering with said first sealing means.

This aspect of the invention thus proposes to separately seal the inlet and outlet terminals of a basic meter so that the outlet terminals may be accessed by a different authorised party to the inlet terminals. By this fundamental approach, it becomes possible for a basic

meter to be installed which is almost as simple as that currently used for the purposes of the local electricity company who connects the customer to the distribution system (the host company). Since the host company can separately seal its connections to the inlet terminals of the basic meter, it can reliably monitor electricity leaving its distribution system at the customers premises, while a separate supplier may then connect an additional metering module to the outlet terminals of a basic meter and individually seal those outlet terminals (along with any inlet connection to the supplier's metering module).

The supplier's metering module will separately measure the electricity passing through its module and will not require a data communication link with the basic meter.

If subsequent metering modules connected to the basic meter also permit separate sealing of their respective outlet terminals, then a number of metering modules can be cascaded so that each interested party may have its own meter which measures the electricity used by the customer. Each interested party can then have access to the outlet terminals of the proceeding metering module without interfering with the inlet connection to that module or to proceeding modules.

It may be noted that the cost of the measurement circuitry used nowadays for electricity metering is minimal, so that the multiplicity of metering circuits implied by the modular system does not have a significant cost implication.

Conveniently, the casing of the above described basic metering module has generally rectangular front and back faces connected by four side walls and said inlet terminals are located at a first of side walls and said

outlet terminals are located at a second of said side walls. This arrangement facilitates the provision of separate sealing means for the inlet and outlet terminals and also facilitates the cascading of several metering modules as will become apparent. The first and second side walls mentioned above may be opposed to each other, although in the basic metering module the first and second side walls may be adjacent side walls.

In one simple arrangement, the metering module may include intermediate mains supply outlet terminals located adjacent to said inlet terminals in a common wall of the casing, an interface block having said outlet terminals and intermediate inlet terminals connected thereto, and electrical connection links interconnecting said intermediate outlet terminals to said intermediate inlet terminals, said first sealing means protecting and sealing both said inlet terminals and said intermediate outlet terminals, and the interface block having said second sealing means. This arrangement provides an interface block which may be used for converting a prior art form of basic meter in which inlet and outlet terminals are in a common wall and protected by the same sealing means.

In another arrangement, said first and second sealing means may comprise a main cover having a first fastening means adapted for fastening and sealing the main cover to the casing to provide said first sealing means, and a secondary cover and second fastening means adapted for fastening and sealing the secondary cover to the main cover to provide said second sealing means. Then said main cover may be a plate adapted to fit over the terminal blocks of both the inlet and the outlet terminals, and having one or more apertures to enable access to the connection blocks of the outlet terminals, the secondary

cover being adapted to cover said apertures.

Preferably, said outlet terminals comprise sockets for receiving connection cables to a customer's load circuit.

Preferably also the metering module includes interlock means to prevent access to said inlet terminals without interfering with said second sealing means.

In a second aspect of the invention, a metering module for metering a mains electricity supply comprises a casing, supply metering means within the casing, mains supply outlet terminals in a first wall of the casing, said outlet terminals comprising sockets for receiving connection cables to a customer's load circuit, and mains supply inlet terminals in a second wall casing, said inlet terminals comprising pins adapted for connection to an electrical supply by insertion in outlet terminal sockets of another metering module. By providing this metering module with inlet terminal pins, the interconnection of modules with a basic metering module is much facilitated. The pins are arranged to fit the outlet terminals of a basic module and also to fit the outlet terminals of another metering module with inlet terminal pins.

Conveniently, said first and second walls of the casing are opposed so that a plurality of said metering modules can be interconnected with the outlet terminal sockets of one receiving the input terminal pins of the next. The modules may include sealing means for protecting and sealing said outlet terminals to inhibit unauthorised access thereto. Said sockets of said outlet terminals are conveniently adapted for receiving the inlet terminal pins of another said metering module. The above described metering module may be used in combination with another metering module which has mains supply inlet

terminals formed as sockets for receiving connection cables from a mains supply and mains supply outlet terminal sockets adapted to receive said inlet terminal pins.

In a further aspect of the invention, a metering installation for a mains electricity supply comprises a plurality of metering modules each having a casing and respective supply metering means within the casing, connection means to connect the supply to be metered through each of said modules in turn for metering by the respective metering means, and respective sealing means for independently protecting and sealing the interconnections between the or each interconnected pair of said modules to inhibit unauthorised access to the respective said interconnection but to permit authorised access thereto without interfering with the sealing means of any other said interconnection or with a sealing means protecting the supply inlet connection to the first of said modules.

The first of said modules directly receiving said mains electricity supply may be a metering module in accordance with the first aspect of the invention described above. The modules apart from the first may be metering modules in accordance with the second aspect of the invention mentioned above.

In yet a further aspect of the invention, there is provided a terminal cover for the inlet and outlet terminal blocks of a mains electricity metering module, comprising a main cover plate adapted to fit over the inlet and outlet terminal blocks, first fastening means adapted for fastening and sealing the main cover plate in position protecting said inlet terminal blocks to inhibit unauthorised access thereto, the main cover plate having

at least one aperture to enable access to said outlet terminal blocks, a secondary cover plate adapted to cover the or each said aperture and second fastening means adapted for fastening and sealing the secondary cover plate to the main cover plate so as to cover the or each said aperture to inhibit unauthorised access to said outlet terminal blocks but to permit authorised access thereto without interfering with said first fastening means.

An example of the invention will now be described with reference to the accompanying drawings in which:

Fig.1 is a schematic representation of a basic meter in accordance with the prior art;

Fig.2 is a schematic illustration of a combination meter and interface block which forms an example of the present invention;

Fig.3 is a schematic illustration of a basic metering module embodying the present invention;

Fig.4 is an enlarged view of a sealing plate for use with the embodiment of Fig.3;

Fig.5 is a schematic illustration of an additional metering module for connection to the basic module illustrated in Fig.3;

Fig.6 is an enlarged illustration of an inlet terminal pin and an outlet terminal socket of the module of Fig.5;

Fig.7 and 8 are schematic illustrations of further examples of metering module embodying the present invention;

Fig.9 is a schematic illustration of an assembly of basic and additional metering modules illustrating an installation embodying the present invention;

Fig.10 is a schematic representation of a further

embodiment of the invention; and

Fig.11 is an illustration of an alternative inlet pin arrangement.

Referring to Fig.1, a standard basic electricity meter is illustrated comprising a casing 10 containing an electricity metering circuit 11 connected between a live inlet terminal 12 and a live outlet terminal 13. Neutral inlet and outlet terminals, 14 and 15 are interconnected directly. Units consumed as measured by the circuit 11 are displayed on a display 16. In accordance with normal practice, all four terminals 12 to 15 are located in a common side wall 17 of the casing 10 and more significantly are protected by a common sealing plate which is shown in dotted outline at 18. The sealing plate can be released by means of a bolt 19 which has provision for the attachment of a seal when the meter is installed by the electricity utility so that access to the terminals 12 to 15 is inhibited and can be obtained only by breaking the seal.

Fig.2 illustrates the basic electricity meter of Fig.1 at 20 but in addition shows an interface block 21. The interface block has intermediate inlet terminals 22 and 23 which are connected by links 24 and 25 to the outlet terminals 13 and 15 of the meter 20. In the composite module illustration Fig.2, the outlet terminals 13 and 15 can be regarded as intermediate outlet terminals. The interface block 21 has main outlet terminals 26 and 27 directly connected to the intermediate inlet terminals 22 and 23.

When the arrangement of Fig.2 is installed at a customers premises, the cables from the electricity supply are connected at inlet terminals 12 and 14 and the connections to a customers load are connected at outlet

terminals 26 and 27. The connections from the links 24 and 25 to the intermediate inlet terminals 22 and 23 of the interface block 21 are protected by a first sealing sealing plate 28 which is fastened by a bolt 29. The outlet terminals 26 and 27 are separately sealed by a sealing plate 30 which is secured by a bolt 31. The bolts 29 and 31 can be separately sealed by different parties so that authorised access to the outlet terminals 26 and 27 does not require interference with the seal protecting the intermediate inlet terminals 22 and 23, or the seal protecting all four terminals of the basic meter 20.

The arrangement shown in Fig.2 has the advantage of enabling an existing prior art basic meter to be converted to a modular meter embodying the present invention. Instead of direct connections in the interface block 21 between the intermediate inlet terminals 22 and 23 and the outlet terminals 26 and 27, the block 21 may include a switch which can be operated to isolate one or both of the terminals 26 and 27 from the supply.

Fig.3 shows a new style basic meter embodying the invention. In Fig.3, inlet terminals 33 and 34 are formed in a lower side wall 35 of the meter casing, whereas outlet terminals 36 and 37 are formed in an adjacent lateral side wall 38. A first sealing plate 39 covers access to the terminals 33 and 34 and is secured by a bolt 40 which may be sealed as before to prevent unauthorised access to the inlet terminals. A separate sealing plate 41 secured by a bolt 42 protects access to the outlet terminals 37 and 36 and may be separately sealed. The basic meter may also include a switch which can be operated to isolate one or both of the inlet terminals 33 and 34 from the corresponding outlet terminals 36 and 37.

Fig.4 is an enlarged view of the sealing plate 41. The plate includes a tenon member 43 extending from an upper end which can be inserted into a corresponding slot formed in the casing of the metering module. The fastening bolt 42 includes a means for sealing the bolt as known in the art.

As can be seen in Fig.3, the sealing plate 41 is arranged to extend when in position protecting the outlet terminals 36 and 37 so as to overlie one end of the sealing plate 39. As a result, sealing plate 39 may not be removed without first removing the sealing plate 41. However, the sealing plate 41 may be removed by an authorised operator breaking the seal on the fastening bolt 42, without interfering with the seal on the bolt 40 securing the plate 39. As mentioned above, the provision of separate sealing means to protect the outlet terminals of the metering module described and illustrated in Fig.3, enables a different interested party to have access to the outlet terminals and connect to them a further metering module as may be required for the purposes of the different party.

A modified embodiment of the invention is illustrated in Fig.10. This illustrates the inlet and outlet terminals of a standard prior art meter such as shown in Fig.1, in combination with a modified form of cover or sealing plate. Referring to Fig.10, both inlet terminals 12 and 14 and outlet terminals 13 and 15 are located in a common side wall 17 of a casing 10 of the meter. Access to the connection blocks of the terminals is provided through apertures 90 in an upper face 91 of the meter. A main cover plate 92 can be located and secured over these apertures 90 by means of a fixing bolt 93 which can be screwed into a threaded hole 94 in the

meter casing. As in standard prior art arrangements, the bolt 93 includes a sealing arrangement to inhibit tampering with the bolt and unauthorised removal of the main cover plate 92.

As illustrated the main cover plate 92 protects the inlet terminals 12 and 14 preventing access to the connection blocks of the inlet terminals without releasing the bolt 93. However, the main cover plate 92 has apertures 95 and 96 located to align with apertures 90 to allow access through the main cover plate 92 to the connection blocks of the outlet terminals 13 and 15. A secondary cover plate 97 is provided to be fastened to the main cover plate 92 fitting over and covering the apertures 95 and 96. The secondary cover plate 97 has a central hole 98 to receive a securing stud 99 formed on the main cover plate 92. The secondary cover plate 97 can then be secured and sealed in place by means of a sealing wire passed through a transverse bore 100 through the part of the stud 99 protruding above the secondary plate 97. It then becomes possible to provide authorised access to the outlet terminals 13 and 15 only without interfering with the sealed bolt 93.

An example of a further metering module is illustrated in Fig.5. The module comprises a casing 50 which contains current metering circuitry and a display 51 to display the units consumed as measured by the metering circuitry within the casing.

The module illustrated in Fig.5 has inlet terminals 52 and 53 formed as pins which are designed to fit in the sockets of the outlet terminals 36 and 37 of the basic metering module illustrated in Fig.3. The live input terminal pin 52 is connected within the casing 50 of the module shown in Fig.5 via metering circuitry 54 to an

output terminal 55. The neutral input terminal pin 53 is in turn connected directly to an output terminal 56. The output terminals 55 and 56 are located on an opposite side wall of the casing 50 relative to the input terminal pins 52 and 53. The output terminals 55 and 56 are formed as sockets substantially identical to the sockets of the output terminals 36 and 37 of the basic metering module, so that the output terminals 55 and 56 may receive the input terminal pins of a further metering module.

Alternatively, the output terminals 55 and 56 may receive connection cables to the customers load.

Fig.6 illustrates in more detail an input terminal pin 60 and an output terminal socket 61 as may be used in the module of Fig.5. Alternatively the inlet terminals 52 and 53 can comprise sockets 63 similar to the output terminals 55 and 56 and separate double-ended pins 64 as shown in Fig.11. This has the advantage that, if required, the pins can be left out and standard cable can be connected instead. This would apply, in particular, to connections between a standard meter and a module without use of the interface block described above with reference to Fig.2.

Access to the output terminal sockets 55 and 56 is protected by means of a sealing plate 57 secured by a bolt 58. The bolt 58 may be sealed to prevent unauthorised access to the terminals 55 and 56 in a manner known in the art.

The metering module illustrated in Fig.5 may be required if a customer chooses to purchase his electricity requirements from a supplier other than the local electricity company which connects the customer to the electricity distribution system. Prior to choosing to change his supplier, the customer will presumably have

purchased his electricity from the local electricity company who may have installed a basic meter as shown in Fig.3. At that time, the local electricity company would have connected its supply cables to the inlet terminals 33 and 34 of the basic meter and also connected the customers connection cables to the outlet terminals 36 and 37. The local electricity company would have then sealed both of the plates 39 and 41 perhaps with a common seal linking the bolts 40 and 42.

When a separate supplier is first appointed, the local electricity company still requires its own meter to monitor the usage of its connections for billing the new supplier for use of system charges. However, the new supplier can instal an additional metering module such as illustrated in Fig.5 for measuring the units consumed by the consumer so that the new supplier can bill the consumer in accordance with the supplier's tariff. The new supplier may therefore remove the sealing plate 41, remove the customer's existing connection cables from terminals 36 and 37, insert the pins 52 and 53 of the supplier's metering module and reconnect the customer's connection cables to the outlet terminals 55 and 56. The new supplier may then reseal the securing bolt 42 on the basic meter and also separately seal the securing bolt 58 on the suppliers additional metering module.

If the basic meter had originally had both securing bolts 40 and 42 sealed together by the local electricity company (the previous supplier) this previous supplier may authorise the new supplier to break this seal and remake a separate seal on its behalf on the securing bolt 40 protecting the inlet terminals 33 and 34 of the basic meter. Alternatively, the original supplier may itself remove the common seal and remake its seal on the bolt 40.

In any case, once the new supplier's additional metering module 50 has been installed and connected up, and all the seals remade, the new supplier can continue on its own to have access to the outlet terminals 36 and 37 by breaking the separate seal on the fastening bolt 42 without interfering with the local electricity company's seal on the bolt 40 protecting the inlet terminals to the basic meter. In this way the new supplier can replace defective metering modules 50 and perform other servicing as required without requiring specific authorisation from the the local electricity company.

It should be noted that in the present example, the customer's connections are made to the outlet terminals 55 and 56 of the metering module 50. Although these outlet terminals may be protected by the sealing plate 57 and the securing bolt 58 sealed, this protection is in fact of lesser significance since any tampering with the connections to terminals 55 and 56 cannot involve bypassing the metering circuit 54 within the metering module 50.

It should also be understood that, whereas the basic meter of the Fig.3 need only measure the total number of units transmitted across the local electricity company's connection system, the supplier's meter of Fig.5 could be designed to provide a more comprehensive metering facility providing a variable rate metering or budget payment facilities for example. In fact, the supplier's metering module 50 might be provided in addition to the basic meter of Fig.3 even if the supplier is in fact the local electricity company. The additional metering module 50 could be supplied at the customer's request to provide the additional facilities mentioned above.

Further metering modules, such as those illustrated in Fig.7 and 8, may be connected in addition to the metering module of Fig.5. For example, the metering module of Fig.7 may be a "customer's module" provided at the request of the particular customer to give certain customer facilities, particularly access to the metering data for budgetry purposes. Thus the customers module may comprise a casing 70 containing metering circuitry 71. Inlet terminal pins 72 and 73 are connected in the usual way to outlet terminal sockets 74 and 75. The outlet terminal sockets 74 and 75 are protected by a sealing plate 76 secured by a bolt 77 which may be sealed as known in the art. The casing 70 may be connected by a low voltage data cable 78 having a plug 79 at one end locating in a mating socket (not shown) in the casing 70. The other end of the cable 78 terminates at a display and keypad 80 which may be mounted at a location convenient for the customer, for example in the kitchen of domestic premises. In this way the customer may use the keypad and display to access current tariff rates, current usage rate and such other information as may be desired.

Fig.8 illustrates a further metering module which could be a "settlement module". This module would be provided by the settlement organisation mentioned previously which monitors all electricity being supplied by the particular supplier at half hourly intervals to ensure appropriate billing within the settlement system. The metering module of Fig.8 again includes a casing 82 containing electricity metering circuitry 83. Input terminal pins 84 and 85 are connected to output terminal sockets 86 and 87. The output terminal sockets are protected by the sealing plate 88 secured by a bolt 89 which can be sealed as known in the art. There is no need

for the settlements module to have any display for local inspection, but the module must signal data regarding electricity units consumed to a central data collection and billing station (the settlements system of the Electricity Pool). Accordingly, the metering module casing 82 is connected by a data line 90 to a two way communication transmitter and receiver 91. In practice, the circuitry within the casing 82 records the units used at half hourly intervals throughout each 24 hour period. This data is stored within the module until the transmitter/receiver unit 91 receives a command from the remote station in response to which the recorded data is read out and transmitted back to the remote station for use in preparing the settlements billing.

Fig.9 illustrates an installation comprising the basic metering module 38 of Fig.3, a supplier's module 50 of Fig.5, a customer's module 70 and 80 of Fig.7 and a settlement module 82 of Fig.8. As shown, each module is connected by its inlet terminal pins to the outlet terminal sockets of the preceding module. The last module, the settlements module, has the customer's supply cables connected to its outlet terminal sockets 86 and 87. The connections from the electricity supply are connected to the inlet terminals 33 and 34 of the basic module. The outlet terminals of each of the four modules are separately sealed by their respective sealing plates and securing bolts.

The modular system enables additional modules to be connected to the basic meter as required so that the expense of a fully comprehensive metering installation is not incurred when the facilities are not required. Parties requiring additional metering facilities, such as a supplier who is not the local electricity company, can

add their own module without breaking all previous seals.
Only the outlet terminal seal of the last module need be
broken and the permission of its owner obtained.

CLAIMS

1. A metering module for metering a mains electricity supply and comprising a casing, supply metering means within the casing, mains supply inlet terminals and mains supply outlet terminals for the module, first sealing means for protecting and sealing said inlet terminals to inhibit unauthorised access thereto, and second sealing means for protecting and sealing said outlet terminals to inhibit unauthorised access to said outlet terminals but to permit authorised access thereto without interfering with said first sealing means.
2. A metering module as claimed in claim 1 wherein the casing has generally rectangular front and back faces connected by four side walls and said inlet terminals are located at a first of said side walls and said outlet terminals are located at a second of said side walls.
3. A metering module as claimed 2 wherein said first and second side walls are opposed to each other.
4. A metering module as claimed in any preceding claim including intermediate mains supply outlet terminals located adjacent said inlet terminals in a common wall of the casing, an interface block having said outlet terminals and intermediate inlet terminals connected thereto, and electrical connection links inter-connecting said intermediate outlet terminals to said intermediate inlet terminals, said first sealing means protecting and sealing both said inlet terminals and said intermediate outlet terminals, and the interface block having said second sealing means.

5. A metering module as claimed in Claim 4 wherein the interface block includes switch means connecting said outlet terminals to said intermediate inlet terminals which is operable to isolate one or both of said outlet terminals.
6. A metering module as claimed in any of Claims 1 to 3 wherein said first and second sealing means comprise a main cover having a first fastening means adapted for fastening and sealing the main cover to the casing to provide said first sealing means, and a secondary cover and second fastening means adapted for fastening and sealing the secondary cover to the main cover to provide said second sealing means.
7. A metering module as claimed in Claim 6 wherein said main cover is a plate adapted to fit over the terminal blocks of both the inlet and the outlet terminals, and having one or more apertures to enable access to the connection blocks of the outlet terminals, the secondary cover being adapted to cover said apertures.
8. A metering module as claimed in any of Claims 1 to 3 and 6 or 7 and including switch means connecting said outlet terminals to said inlet terminals which is operable to isolate one or both of said outlet terminals.
9. A metering module as claimed in any preceding claim wherein said outlet terminals comprise sockets for receiving connection cable to a customer's load circuit.
10. A metering module as claimed in any preceding claim and including interlock means to prevent access to said

inlet terminals without interfering with said second sealing means.

11. A metering module for metering a mains electricity supply and comprising a casing, supply metering means within the casing, mains supply outlet terminals in a first wall of the casing, said outlet terminals comprising sockets for receiving connection cables to a customer's load circuit, and mains supply inlet terminals in a second wall of the casing said inlet terminals comprising pins adapted for connection to an electricity supply by insertion in outlet terminal sockets of another metering module.

12. A metering module as claimed in claim 11, wherein said first and second walls of the casing are opposed so that a plurality of said metering modules can be interconnected with the outlet terminal sockets of one receiving the inlet terminal pins of the next.

13. A metering module as claimed in either of claims 11 and 12 and including sealing means for protecting and sealing said outlet terminals to inhibit unauthorised access thereto.

14. A metering module as claimed in any of claims 11 to 13 wherein said sockets of said outlet terminals are adapted for receiving the inlet terminal pins of another said metering module.

15. A metering module as claimed in any of claims 11 to 14 in combination with another metering module which has mains supply inlet terminals formed as sockets for

receiving connection cables from a mains supply and mains supply outlet terminal sockets adapted to receive said inlet terminal pins.

16. A metering installation for a mains electricity supply comprising a plurality of metering modules each having a casing and respective supply metering means within the casing, connection means to connect the supply to be metered through each of said modules in turn for metering by the respective metering means and respective sealing means for independently protecting and sealing the interconnections between the or each interconnected pair of said modules to inhibit unauthorised access to the respective said interconnections but to permit authorised access thereto without interfering with the sealing means of any other said interconnections or with sealing means protecting the supply inlet connection to the first of said modules.

17. A metering installation as claimed in claim 16 wherein at least the first of said modules directly receiving said mains electricity supply is a metering module as claimed in any of claims 1 to 10.

18. A metering installation as claimed in claim 16 or claim 17 wherein at least the or each of said metering modules apart from the first directly receiving said mains electricity supply is a metering module as claimed in any of claims 11 to 14.

19. A terminal cover for the inlet and outlet terminal blocks of a mains electricity metering module, comprising a main cover plate adapted to fit over the inlet and

outlet terminal blocks, first fastening means adapted for fastening and sealing the main cover plate in position protecting said inlet terminal blocks to inhibit unauthorised access thereto, the main cover plate having at least one aperture to enable access to said outlet terminal blocks, a secondary cover plate adapted to cover the or each said aperture and second fastening means adapted for fastening and sealing the secondary cover plate to the main cover plate so as to cover the or each said aperture to inhibit unauthorised access to said outlet terminal blocks but to permit authorised access thereto without interfering with said first fastening means.

20. A metering module substantially as hereinbefore described with reference to and as shown in any of Figures 2 to 8 and 10 or 11 of the accompanying drawings.

21. A metering installation substantially as hereinbefore described.

22. A terminal cover as claimed in Claim 19 and substantially as hereinbefore described with reference to and as illustrated in Figure 10 of the accompanying drawings.

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Relevant Technical Fields	Search Examiner J BETTS
(i) UK Cl (Ed.M) G1U (UR1104, UR1124, UR1102) (ii) Int Cl (Ed.5) G01R 11/04, 11/24, 11/02	Date of completion of Search 23 JUNE 1994
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE DATABASES: WPI	Documents considered relevant following a search in respect of Claims :- 1-10, 16-22

Categories of documents

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Category	Identity of document and relevant passages	Relevant to claim(s)
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Relevant Technical Fields

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Search Examiner
J BETTS

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23 JUNE 1994

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(ii)

Documents considered relevant following a search in respect of Claims :-
11-15

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Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 1204111	(LEB) Whole document	11
X	US 4901007	(SWORM) Whole document	11

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